CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH
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Weekly Bulletin

Entered as second-class matter February 21, 1922, at the post office at Sacramento, California, under the Act of August 24, 1912.
Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917.

Vol. XVI, No. 23 July 3, 1937 GUY P. JONES EDITOR

Why Epidemics

(Continued from last issue)

The medical discipline—epidemiology—considered as the science of the host and infection chains studies their interaction—in its end effects as morbidity and mortality. In recent years, the symptomless latent infections have been drawn within the range of these valuations. Statistical epidemiology, through its consecutive registrations within a given time interval, discloses definite regularities which are made the subject of inductive and deductive analyses. Although the etiologic-deductive approach has changed the Prepasteurian epidemiology from a description to an investigative science, it has failed to furnish satisfactory explanations for the rise and fall of epidemics. Yet, it is reasonable to anticipate in time the development of procedures whereby the rhythmical fluctuations or the periodicity in the number of hosts may permit a clearer understanding of the mechanism responsible for the mass phenomena. However, the comprehension of mass reactions is dependent on a clearer understanding of the single infection since, doubtless, nothing can happen in the nature of an epidemic which has not already been founded on the single infection. A prognosis of the epidemiologic events may be attempted in certain exceptional instances, provided the host transmission chains are not subjected to a great many accidentally irregular factors. The character of the epidemic wave during the first weeks of an epidemic year may prognosticate the trend of the disease during the entire calendar period. Equally potent on the course of an epidemic are economic and cultural factors. It is well known, that from the number of illiterates, conclusions relative to the spread and course of an epidemic may be predicted. However, the scientific evidences at hand are not sufficiently sound to venture a prognosis concerning the probable severity of an impending epidemic. Logic and arithmetic can measure some of the phenomena observed in epidemics, but abstruse problems and riddles are still in abundance. For example, the seasonal occurrence of an infection is only satisfactorily explained in the diseases dependent upon insect transmission. Explosive outbreaks of intestinal infections, such as typhoid fever and cholera may be interpreted, but the condition conducive to similar sudden mass illnesses caused by dengue fever or influenza are not known. The age and sex incidences of communicable diseases are uncertain quantities, since the mortality and such morbidity data as are available afford only meager approximations. The great pandemic of influenza in 1918-1919, the rise of the virus diseases of the central nervous system, the disappearance of plague in rats and its corresponding spread in wild rodents as well as the extreme mildness of small-pox are events which may shake one's confidence in the pragmatic philosophy of the bacteriological and the serological laboratory. That such an attitude is not justifiable is clearly demonstrated by the development during the past years. The cause of influenza,

its probable transmission by droplet nuclei has been recognized. Greater familiarity with the viruses has thrown light on the infection of the central nervous system. Until recently, no explanation could be offered for the observation that human malaria carriers and Anopheles mosquitoes could exist in the same region without epidemic distribution of the disease. Inductive epidemiology recorded this phenomenon as "locality immunity" without offering an explanation. Swellengrebel, by means of laboratory tests, clearly showed that the zoological relationship of a mosquito belonging to the Anophelinae does not necessarily stigmatize such an insect as a vector of the malarial parasites. Certain varieties of Anopheles are not endowed with ability to encourage and maintain the multiplication of the ingested gametes. The pathway of infection, an integral part of the malarial infection due to the absence of suitable mosquitoes, is, therefore, nonexistent.

Many additional examples could be cited to illustrate complicated situations which are not subject to synthetic analysis. Despite this unsatisfactory state of affairs, it is rational to adhere to the facts presented by the epidemiologic phenomena. In so doing, it is immediately recognized that man through his activities may effectively interfere and interrupt the host and infection chains. His actions may be intentional or accidental, palliative and even radical. Social reforms beyond any doubt have been p r i m a r i l y responsible for the complete disappearance of certain infectious diseases in territories inhabited by millions of people. These planless but radical effects of a progressive civilization prevent or continuously hinder the particular pathways of transmission. Bubonic plague has always been said to be a disease of primitive civilizations. After the middle of the seventeenth century, it surely and steadily receded from Europe and at the close of the nineteenth century, it was almost forgotten. It was known to exist only in the remote parts of Africa, India, Persia and China. These great changes, particularly in England, were effected by the Agrarian Revolution which began about 1730 and lasted until 1845, and changed the housing of the people and their social habits. Previous to this social revolution, men lived in poorly constructed clay-walled chimneyless homes in a single room with the cattle, pigs and poultry. In such circumstances rats were brought into close propinquity to men and so favored plague conditions. Other diseases in addition to plague and malaria were equally banished by the social reforms; leprosy, relapsing fever, cholera, etc., have disappeared from the northern, central and western European countries. During the Tudor period, money came into more common use; rents were paid in cash and labor was rewarded in wages. Thus the powerful forces affecting the mode of living followed as automatic consequences the economic prosperity which spread over larger and larger population groups. Today, it is fully recognized that a successful alleviation of epidemics is not possible where the standard of living falls below the level of tolerable existence. In China, the prevalence of epidemic disease is due to bad water supplies, unhygienic housing conditions, ignorance and primarily the poverty of the population. Equally powerful in banning the course of epidemics has been the increased influence of the urban over rural culture. At first, this appears as a paradox since the crowding of people in large cities offers eminently effective conditions, perhaps not as to the origin but certainly for the spread of a communicable disease. For such diseases as influenza this may doubtless be true. However, comparisons of rural and city death rates usually show that the rural rate is decidedly higher. The larger the population the better are the sanitary environmental control measures. Quite generally it is now recognized that the congregation of the masses is only a disadvantage when it is accompanied by misery and squalor. In fact, as soon as this phase has been eliminated, striking effects are continuously recorded. Not only the permanent regional eradication of certain epidemics becomes a fact, but the morbidity and mortality due to communicable diseases generally declines. Before our eyes this process has continued its progress since the latter part of the last century. It has, in part, been temporarily interrupted by the Great War, and particularly in regions where starvation and filth created conditions comparable to those of the Middle Ages. To what extent the planned suppressive and eradicative measures had any influence on the course of these events is difficult to estimate. Doubtless they were great but a significant fraction must be attributed to the alleviation of economic and social inequalities. No one will deny that the continuous decline of pulmonary tuberculosis, with a death rate of from over 440 per 100,000 population in 1849 to less than 50 in 1932, has been accomplished by raising the economic level and increasing the requirements for decent living. Although phthisis, the morbus pauporum, as an infection will never be conquered it is reasonable to expect a further decline in the mortality, provided the economic factors are supplemented by general environmental conditions concerning the crowding of people.

It is, therefore, by no means utopian to anticipate the elimination of other mass ailments through pro-

gressive sociologic growth of the white race. The significance of such an event can not be evaluated. But despite this justifiable optimism, it is imperative to emphasize the danger of retrogression as evidenced by the terrible catastrophies of epidemic disease which flooded Russia during and after the war. By 1922, Tarassévitch estimated that the morbidity due to louse borne typhus was 30 million people or 20-25 per cent of the whole Russian population. With a mortality of 10 per cent, the typhus deaths alone amounted to 3 million people. Relapsing fever, cholera, enteric fever, dysentery and many other infectious diseases contributed their share to the frightful carnage from which Russia emerged after the crisis with a loss of from 20 to 25 per cent of her population. As chief immediate causes must be listed: poor nourishment, famine, dirt due to shortage of soap, cold due to lack of fuel, overcrowding, unsatisfactory conditions of railroad traveling, shortage of medical supplies and deterioration of water supplies and drainage. What has taken place in Russia repeats itself elsewhere, although on a less gigantic scale. Moreover, on closer scrutiny, one notices that changes in the mode of living of the masses create more insidiously and less brutally conditions which ultimately may be reflected in the epidemic status of the nations. If social disorganization should occur in the near future, it is quite likely that not the most controllable, typhus and plague but influenza and its associates, the infections of the nervous system, thus far unknown quantities, would reap their harvest.

In the light of what has been said, is it then reasonable to hope for an eradication of a few infections from the inhabitated parts of the world? There is ample evidence to expect such a possibility. What has been accomplished in certain regions may well be realized elsewhere on a much greater scale. Equalizations in the cultural levels of the colored to that of the white race may in the distant future contribute quite unexpectedly to the eradication of many diseases among the former.

Finally, what is the goal of the active control measures against epidemics as far as they are influenced by progress in microbiology? They are preeminently suppressive measures engaged in preventing the spread and dissemination of the infectious agents. As a whole the achievements have been quite moderate. It is regrettable that the struggle is conducted in a desultory manner without giving any indication of the ultimate aim of eradicating certain communicable diseases. The isolation of leperous patients led to the disappearance of leprosy from Central Europe. Even more impressive is the reduction in the incidence of smallpox through *the active immunization according to the method of Jenner*. These examples amply attest to the significant possibilities. The partial eradication of smallpox is particularly instructive, since the same results could not have been realized by a natural permeation of the variola virus through the population groups. Similarly for a number of other diseases, experimental evidence has shown that the individual resistance to infection may be raised by an appropriate administration of the toxin of the bacillus or the attenuated variant of a virus. An obvious suggestion is that outbreaks of these diseases may be prevented by raising the resistance to the risk of all susceptibles. The time has doubtless arrived when national and international and State and municipal organizations must cooperate in the formulation of really constructive long range programs directed towards the ultimate conquest of the principal infectious diseases. The welfare of future generations with respect to epidemics will be better served in this way than by the narrow passionate demands of the moment or of national self protection.

Such plans may greatly benefit by a reformation in the methods of research and in the teaching of the parasitic diseases. Today, these two activities are divided among the clinicians, the pathologists, the microbiologists, the parasitologists and the workers in public health. In its scientific exploration and its teachings, this enormous and important field instead of being unified is degraded into subsidiary departments and subjects. The existing institutional facilities and opportunities create ultraspecialization with all its harmful effects upon fundamental concepts, factual knowledge and technical skill. A microbiologist or parasitologist without clinical and pathological training and experience is a narrow investigator and an equally poor teacher. Centralization embracing even the social sciences and a reunion of the estranged disciplines within useful boundaries appears imperative.

(Continued in next issue)

Democracy implies citizens who take an interest in government. Only through their cooperation are problems solved. Since society is constantly changing, one public matter after another comes before us for decision. Policies, indeed, of far-reaching effects are decided by the people. This has been usage and law ever since our Declaration of Independence. We have put our hand to the plow, and have no intention to turn back. Therefore, as citizens, we must be alert, keep on learning, and be informed. Our success means great things, not only to ourselves but also to other peoples who are influenced by our national life. Sound political life, then, within our own borders tends to conserve peace throughout the world.

MORBIDITY

Complete Reports for Following Diseases for Week Ending June 26, 1937

Chickenpox

392 cases: Alameda 12, Albany 1, Berkeley 21, Oakland 28, Colusa County 1, Contra Costa County 2, Fresno 1, Eureka 2, Kern County 1, Los Angeles County 28, Alhambra 7, Arcadia 1, Beverly Hills 1, Burbank 1, Compton 1, El Monte 1, Glendale 1, Huntington Park 3, Inglewood 3, Long Beach 10, Los Angeles 50, Montebello 1, Pasadena 8, San Gabriel 2, Santa Monica 5, Whittier 1, Torrance 1, Signal Hill 1, Maywood 2, Bell 1, Marin County 2, Yosemite National Park 1, Orange County 7, Anaheim 4, Brea 1, Orange 1, Santa Ana 4, Placentia 1, Tustin 8, Riverside County 4, Sacramento County 1, Sacramento 16, North Sacramento 2, San Bernardino County 3, San Bernardino 2, San Diego County 5, Coronado 1, National City 12, San Diego 26, San Francisco 42, Stockton 5, San Luis Obispo County 2, San Luis Obispo 2, South San Francisco 9, Santa Barbara County 1, Santa Barbara 1, Santa Clara County 2, San Jose 5, Benicia 4, Vallejo 3, Ventura County 10, Fillmore 5, Oxnard 1, Yuba County 1.

Diphtheria

31 cases: Oakland 2, Fresno 1, Kern County 1, Los Angeles County 2, Los Angeles 5, Santa Monica 1, South Pasadena 1, Merced County 1, Riverside County 1, Sacramento 3, San Diego 3, San Francisco 1, Santa Barbara 2, Visalia 1, Ventura County 2, Oxnard 1, Yolo County 1, Woodland 1, Marysville 1.

German Measles

13 cases: Berkeley 1, Oakland 1, Los Angeles County 1, Los Angeles 1, Lynwood 1, Orange County 2, Riverside 1, San Diego 2, San Francisco 1, Palo Alto 1, Santa Cruz County 1.

Influenza

10 cases: Oakland 1, Kern County 1, Los Angeles County 1, Los Angeles 3, San Francisco 3, Yolo County 1.

Malaria

4 cases: Kern County 2, California 2.*

Measles

167 cases: Berkeley 1, Fresno County 1, Fresno 1, Kern County 1, Bakersfield 1, Los Angeles County 3, Alhambra 1, Beverly Hills 2, Burbank 3, El Monte 1, Glendale 4, Huntington Park 1, Inglewood 2, Long Beach 3, Los Angeles 5, South Pasadena 1, Orange County 3, Anaheim 10, Santa Ana 1, Riverside County 5, Corona 22, Riverside 2, Sacramento County 8, Sacramento 9, Ontario 3, Upland 1, San Diego County 18, El Cajon 4, National City 2, San Diego 10, San Francisco 24, San Joaquin County 2, Stockton 1, San Luis Obispo County 2, Daly City 1, Solano County 1, Vallejo 1, Tulare County 4, Oxnard 1, California 1.*

Mumps

260 cases: Berkeley 13, Oakland 6, Butte County 2, Placerville 1, Fresno 2, Humboldt County 2, Eureka 3, Inyo County 1, Kern County 2, Los Angeles County 22, Alhambra 3, Beverly Hills 1, El Monte 2, El Segundo 2, Huntington Park 7, Inglewood 1, Long Beach 2, Los Angeles 28, Pasadena 3, San Gabriel 1, Santa Monica 9, Lynwood 1, South Gate 8, Monterey Park 1, Orange County 7, Santa Ana 2, Laguna Beach 1, Sacramento County 3, Sacramento 1, San Bernardino 1, San Diego County 8, Chula Vista 2, Escondido 1, National City 3, San Diego 44, San Francisco 42, San Joaquin County 3, Stockton 1, San Luis Obispo County 2, Burlingame 1, Daly City 1, Santa Barbara County 1, Lompoc 1, Santa Barbara 3, Santa Clara County 2, Palo Alto 1, San Jose 1, Tulare County 1, Ventura County 2, Yolo County 1, California 1.*

Pneumonia (Lobar)

29 cases: Oakland 1, Calaveras County 1, Eureka 1, Los Angeles County 3, Azusa 1, Glendale 1, Long Beach 1, Los Angeles 9, Pasadena 2, San Fernando 1, Lynwood 1, Maywood 1, Merced County 1, Riverside County 1, Riverside 1, Sacramento 1, San Francisco 1, Santa Clara County 1.

Scarlet Fever

100 cases: Alameda County 1, Berkeley 1, Oakland 7, San Leandro 1, Antioch 1, El Cerrito 1, Eureka 4, Westmoreland 1, Kern County 1, Bakersfield 7, Susanville 2, Los Angeles County 8, Arcadia 2, Azusa 1, Burbank 1, Compton 1, Culver City 1, Glendale 2, Inglewood 1, Long Beach 4, Los Angeles 18, Santa Monica 3, South Gate 1, Madera County 1, Madera 1, Napa 3, Orange County 1, Orange 1, Santa Ana 1, Sacramento 1, North Sacramento 1, San Francisco 7, San Joaquin County 1, San Mateo County 1, Redwood City 1, Santa Barbara 2, San Jose 3, Tulare County 1, Ventura County 3, Ventura 1.

Smallpox

26 cases: Los Angeles 14, Long Beach 1, Pasadena 1, Riverside County 1, Riverside 1, San Diego County 1, San Diego 7.

* Cases charged to "California" represent patients ill before entering the State or those who contracted their illness traveling about the State throughout the incubation period of the disease. These cases are not chargeable to any one locality.

Typhoid Fever

10 cases: Fresno 1, Kern County 2, Los Angeles County 6, Los Angeles 1.

Whooping Cough

461 cases: Alameda 1, Berkeley 3, Oakland 5, Butte County 1, Colusa County 4, Antioch 1, Fresno County 6, Fresno 10, Kern County 9, Bakersfield 1, Los Angeles County 45, Alhambra 6, Arcadia 1, Avalon 6, Culver City 2, Glendale 1, Huntington Park 8, Inglewood 1, Long Beach 6, Los Angeles 99, Monrovia 2, Pasadena 10, San Fernando 1, Santa Monica 2, Whittier 1, Hawthorne 1, South Gate 2, Madera County 1, Monterey 3, Orange County 5, Anaheim 4, Brea 3, Santa Ana 1, Riverside 4, Sacramento 12, San Bernardino County 1, San Bernardino 2, San Diego County 9, San Diego 14, San Francisco 62, San Joaquin County 42, Lodi 2, Stockton 4, San Luis Obispo County 4, San Mateo County 14, Santa Barbara County 7, Lompoc 2, Santa Barbara 5, Santa Clara County 2, San Jose 2, Vacaville 2, Modesto 6, Ventura County 11, Ventura 2.

Meningitis (Epidemic)

4 cases: Los Angeles 2, Pasadena 1, Signal Hill 1.

Dysentery (Amoebic)

5 cases. San Francisco 1, Oakdale 4.

Dysentery (Bacillary)

17 cases: Los Angeles County 2, Alhambra 1, Los Angeles 13, Madera 1.

Pellagra

3 cases: Berkeley 1, Los Angeles County 1, Los Angeles 1.

Poliomyelitis

9 cases: Los Angeles County 3, Alhambra 1, Culver City 1, Glendale 2, Pasadena 1, San Francisco 1.

Tetanus

2 cases: Los Angeles County 1, San Diego 1.

Trachoma

4 cases: Fresno County 3, South San Francisco 1.

Encephalitis (Epidemic)

2 cases: Kern County 1, Long Beach 1.

Paratyphoid Fever

2 cases: Sacramento County 1, Ventura 1.

Jaundice (Epidemic)

One case: El Dorado County.

Food Poisoning

11 cases: Los Angeles County 4, San Diego County 2, Lodi 5.

Undulant Fever

One case: Los Angeles County.

Tularemia

One case: Kern County.

Coccidioidal Granuloma

One case: Los Angeles.

Human Rabies

One case: Los Angeles.

Rabies (Animal)

62 cases: Fresno County 2, Coalinga 1, Fresno 4, Eureka 1, Kings County 1, Los Angeles County 16, Beverly Hills 2, Long Beach 1, Los Angeles 23, Redondo 1, Santa Monica 4, South Gate 1, Maywood 2, Madera County 1, Indio 1, Visalia 1.

Laws are for protection, for ourselves and for other people; to be a success as a citizen, we must each one respect our fellow man's rights, and we should obey and keep the laws as long as they are laws.

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